REMARKS/ARGUMENTS

Request for Corrected Filing Receipt

Initially, Applicants' attorney notes that the inventorship listed on the official Filing Receipt for the present application (copy attached hereto) is incorrect because co-inventor Fanwen Zeng is not listed. As shown by the attached copy of the Declaration And Power Of Attorney, which was previously submitted to the USPTO in November 2001, the present application has a total of five inventors, including Fanwen Zeng (see last page of Declaration And Power Of Attorney). It is respectfully requested that the USPTO records be corrected and that a Corrected Filing Receipt, listing Fanwen Zeng as a co-inventor thereon, be issued and mailed to the correspondence address of record for this application.

Claim Rejections Under 35 U.S.C. § 102(b)

Claims 1 and 4-7 have been rejected, under 35 U.S.C. § 102(b) as being anticipated by the disclosure of U.S. 4,278,576 (hereinafter, "Goldman") (see page 2 of the Office Action. Applicant respectfully traverses this rejection for the reasons which follow.

The present invention, as recited in independent Claim 1, relates generally to a process for preparing a powdery impact modifier, that comprises the steps of providing a polymer particle dispersion which comprises (a) a first population of polymer particles, and (b) a second population of polymer particles; and spray drying the particle polymer dispersion. More particularly, the process of amended Claim 1 further comprises the features wherein the mean particle diameter of the first population of polymer particles is at least 50 percent larger than the mean particle diameter of the second population of polymer particles, and wherein the total rubbery weight fraction of the first and second populations of polymer particles is greater than 90 weight percent.

Goldman fails to disclose all the features of the present invention as recited in amended independent Claim 1 and, therefore, Goldman does not anticipate amended Claim 1. While Goldman discloses core-shell impact modifier polymers, they are different from the present invention for two reasons. First, Goldman discloses only a unimodal system (i.e., one population of core-shell polymer particles), whereas the

present invention of amended Claim 1 is directed to a bimodal system (i.e., first and second populations of polymer particles wherein the mean particle diameter of the first population of polymer particles is at least 50 percent larger than the mean particle diameter of the second population of polymer particles).

On page 2 of the Office Action, Examiner asserts that polymer particle dispersions inherently have a distribution of particle sizes and such distributions can be described as being comprised of any number of arbitrarily selected populations with most any value of the ratio of particle sizes. However, it is precisely because such characterization would be arbitrary that it would also be meaningless to persons of ordinary skill in the art to describe a particle dispersion having a unimodal particle size distribution as being comprised of more than one population where the populations are distinguishable based on their particle size.

Thus, persons of ordinary skill in the art do not describe particles having unimodal particle size distributions as having multiple "populations" of particles based on particle size, even where the particle size distribution is broad enough to support such characterizations as proposed by the Examiner. Differentiation between groups of particles based on particle size is generally reserved for circumstances where the groups of particles contain a number of particles of a particular size or size range such that two or more "modes" are present when measured and analyzed statistically (for example, see the attached Exhibit A, which is an article published by Colloidal Dynamics, "Particle Size Distributions", 1999, which describes accepted methods of measuring and plotting particle size distribution of particles in a colloidal suspension or emulsion).

The Examiner states in the Office Action, that since Claim 1 fails to specifically recite the term "bimodal" to describe the overall, collective size distribution of the first and second populations of particles, and in view of the aforesaid potential for broad and arbitrary characterization of the particle size distribution of unimodal particle dispersions, that prior disclosures in the art wherein a unimodal particle dispersion is disclosed anticipates the present invention as recited in Claim 1. However, it is respectfully submitted that the detailed description provided in the present specification would prohibit such an interpretation of the subject matter of Claim 1. More specifically,

the discussion in the present specification, beginning at page 9, line 26 and ending at page 10, line 19, which relates to large and small particle "modes", particle packing factors and "multi-populations" require the interpretation of the first and second populations of polymer particles to correspond to modes present in the particle size distribution of the particles of the polymer particle dispersion. Conversely, where the size distribution of the particles is unimodal, the aforesaid discussion provided in the present specification is rendered inapplicable. For example, the packing factor of particles in a particle dispersion having a unimodal size distribution could not be accurately approximated using the "packing factor" principles and calculations discussed in the present specification. Thus, the language of Claim 1 (which recites that the polymer particle dispersion comprises a first and a second population of polymer particles and that the mean particle diameter of the first population of polymer particles is at least 50 percent larger than the mean particle diameter of the second population of polymer particles), coupled with the present disclosure and the general knowledge in the art, are sufficient for persons of ordinary skill to understand that that the polymer particle dispersion recited in Claim 1 has a multi-modal particle size distribution and that the first and second populations of particles each necessarily correspond to one such mode. In the foregoing circumstances, it is respectfully submitted that it is unnecessary to add the term "bimodal" or "multimodal" to Claim 1 and that Goldman does not anticipate the present invention as recited in Claim 1.

Another failing of the disclosure of Goldman relates to the rubber composition of the particles. While Goldman asserts the capability of the invention disclosed therein to produce core-shell impact modifier polymer particles having a total rubber content of from 60% to 100%, the examples provided therein demonstrate impact modifier particles having a <u>maximum rubbery weight fraction of 88 weight percent</u> of the total weight of the polymer, and addition of stearate coated calcium carbonate as a flow aid is required by the process of Goldman to achieve this rubber content. On the other hand, the present invention as recited in amended independent Claim 1 recites that the total rubbery weight fraction of the first and second populations of polymer particles is <u>greater than 90 weight percent</u>. The examples provided in the present specification clearly demonstrate the capability of the process of the present invention to produce

impact modifier polymer particles having a total rubbery weight fraction of greater than 90 weight percent, either without any flow aid at all, or with less flow aid than required by the process of Goldman (which, in any event, achieved only 88 weight percent total rubber). As explained at page 2, line 25 to page 3, line 3, of the present specification, it is the presence of two populations of polymer particles in a bimodal relationship, i.e., where the mean particle diameters of the populations vary by at least 50 percent that enables the process of the present invention to produce powdery impact modifier polymer particles having greater than 90 % rubber content.

As discussed hereinabove, Goldman fails to disclose all the features of the present invention as recited in amended independent Claim 1 and, therefore, Claim 1 is believed to be novel and allowable over Goldman. Since Claims 4-7 are each dependent, either directly or indirectly, from Claim 1, it is believed that Claims 4-7 are also allowable over Goldman. In the foregoing circumstances, withdrawal of the rejection of Claims 1 and 4-7 under 35 U.S.C. § 102(b) is hereby respectfully requested.

Claim Rejections Under 35 U.S.C. § 103(a)

On page 3 of the Office Action, all of the pending Claims 1-10 have been rejected, under 35 U.S.C. § 103(a), as being obvious and, therefore, unpatentable over Goldman in view of U.S. 4,334,039 (hereinafter, "Dupre"). Applicant respectfully traverses this rejection for the reasons which follow.

As discussed hereinabove, Goldman differs from the present invention as recited in amended independent Claim 1 because it fails to disclose a process for preparing a bimodal system of polymer particles, nor does it disclose a total rubbery weight fraction of greater than 90 weight percent. It is respectfully submitted that the disclosure of Dupre cannot remedy the aforesaid deficiencies of Goldman because the process disclosed by Dupre is not combinable with the process disclosed by Goldman. As discussed hereinafter, such combination would destroy the capability of the process of Goldman to function as intended.

More particularly, Goldman discloses a process for the preparation of preparing and isolating impact modifier polymers having up to 88% rubber content and also discloses a composition comprising a blend of the aforesaid impact modifier polymers

and a thermoplastic matrix polymer. Dupre, on the other hand, discloses a process for the preparation of a "polyblend" (monoalkenyl aromatic polyblend) containing a rubber phase that has a bimodal distribution. The polyblend of Dupre is analogous to the blended composition of Goldman, not the rubber-containing impact modifier polymer of Goldman. The rubber phase of Dupre never exists as a separate entity – i.e., the rubber phase of Dupre is never a separate dispersion of polymer particles having two or more populations of particles, such as powder rubber-containing impact modifier polymer of Goldman. As explained in Goldman and the present application, isolation of high runner content polymer particles useful as impact modifiers into free-flowing powder form has been a significant problem in the art. Dupre does not address the preparation of powdery impact modifiers separately from the polymer matrix to which they will be added. In fact, even if it were possible to combine the process of Dupre with the process of Goldman, the resulting process would not be capable of producing powdery impact modifier polymer particles separate from the matrix resin and, therefore <u>the intended function and benefits of the Goldman process would be destroyed</u>.

In view of the foregoing discussion, it is respectfully submitted that independent Claim 1, as well as Claims 2-10 which depend directly or indirectly therefrom, are not obvious and, therefore, are patentable, over the combination of Goldman and Dupre. Withdrawal of this rejection of Claims 1-10 is hereby respectfully requested.

<u>Conclusion</u>

Based upon the foregoing discussion and explanation, it is believed that Goldman fails to anticipate Claims 1 and 4-7. It is further believed that the combination of Goldman and Dupre fails to render Claims 1-10 obvious. Thus, it is believed that Claims 1-10 are in condition for allowance. Applicants and their attorney hereby respectfully request re-examination and allowance of Claims 1-10.

A fee of **$110** is believed to be due in connection with the submission of this Response, since it is being submitted within one month after the originally set due date for response to the Office Action. This $110 fee is addressed by the accompanying Petition for Extension, which authorizes the $110 to be charged to **Deposit Account No. 18-1850.**

No additional fees are believed to be due in connection with the submission of this Response. If, however, any such fees, including petition and extension fees, are due in connection with the submission of this Response, the Commissioner is hereby authorized to charge such fees to **Deposit Account No. 18-1850.** In the meantime, please direct all future correspondence relating to the present application to the undersigned attorney.

Respectfully submitted,

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Date: **October 29, 2004**

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COPY

OIPE JC37 NOV 0 1 2004 PATENT & TRADEMARK OFFICE

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WASHINGTON, D.C. 20231
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APPLICATION NUMBER	FILING DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	DRAWINGS	TOT CLAIMS	IND CLAIMS
09/981,425	10/17/2001	1714	870	A01123		10	1

CONFIRMATION NO. 6261

UPDATED FILING RECEIPT

OC000000007153991

21898
ROHM AND HAAS COMPANY
PATENT DEPARTMENT
100 INDEPENDENCE MALL WEST
PHILADELPHIA, PA 19106-2399

PSC

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DEC 1 0 2001

PATENT DEPARTMENT

Date Mailed: 12/04/2001

Receipt is acknowledged of this nonprovisional Patent Application. It will be considered in its order and you will be notified as to the results of the examination. Be sure to provide the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION when inquiring about this application. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please write to the Office of Initial Patent Examination's Customer Service Center. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections (if appropriate).**

Applicant(s)

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Domestic Priority data as claimed by applicant

THIS APPLN CLAIMS BENEFIT OF 60/243,513 10/25/2000

Foreign Applications

If Required, Foreign Filing License Granted 11/16/2001

Projected Publication Date: 04/25/2002

Non-Publication Request: No

Early Publication Request: No

Title

Processes for preparing impact modifier powders

Preliminary Class

COPY

Attorney Docket No. A01123

DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am
[ ] the original, first and sole inventor
[X] an original, first and joint inventor
of the subject matter which is claimed and for which a patent is sought on the invention entitled Processes for Preparing Impact Modifier Powders, the specification of which
[ ] is attached hereto.
[x] was filed on 10/17/01 as
Application Serial No. 09/981,425
and amended on ________________ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the Patent and Trademark Office information known to me to be material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, §1.56.

[ ] I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Application No.	Country	Date of Filing (day, month, yr.)	Priority Claimed yes/no

[X] I hereby claim priority benefits under Title 35, United States Code, §119(e)(1) of any provisional application for patent listed below and have also identified below any provisional application for patent having a filing date before that of the application on which priority is claimed:

Provisional Appl. No.	Date of Filing (day, month, yr.)	Priority Claimed yes/no
60/243,513	10/25/00	Yes

[ ] I hereby claim the benefit under Title 35, United States Code, §120, of any United States application(s) listed below, and insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose to the Patent and Trademark Office information known to be material to patentability of this application, as defined in Title 37, Code of Federal Regulations, §1.56, which became available between the filing date of the prior application and the national or PCT international filing date of this application:

Application Serial No.	Date of Filing (day, month, yr.)	Status - Patented, Pending, Abandoned

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

I hereby appoint the following attorneys and agents to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

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Colloidal Dynamics
leaders in colloid measurement

Exhibit A

Particle Size Distributions

Abstract

Describes methods of measuring and analyzing the Particle Size Distribution (PSD) in a colloidal suspension or emulsion.

Table of Contents

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Colloidal Dynamics Inc, 11 Knight Street, Building E18, Warwick, RI 02886 USA

www.colloidal-dynamics.com

1 Introduction

The particles in a colloidal suspension or emulsion are seldom all of the same size and they often have varying shapes. Describing the size and shape is therefore a significant problem. Emulsion droplets can usually be assumed to be spherical (so long as the distances between the droplets is large enough).

For solid particles we often have to make do with general descriptions of shape like spheroidal, rod- or disk-shaped, even when the system contains individual particles with other shapes.

The particle size may also vary over quite a wide range. It is not unusual for the particles of a suspension produced in a grinding operation, for example, to vary by a factor of 100 from the smallest to the largest size. To describe such situations we normally break the range up into a number of classes and try to find out how many particles are in each size range.

This range is called the particle size distribution (PSD), and it can be represented in the form of a Table or a histogram (see Figure 1).

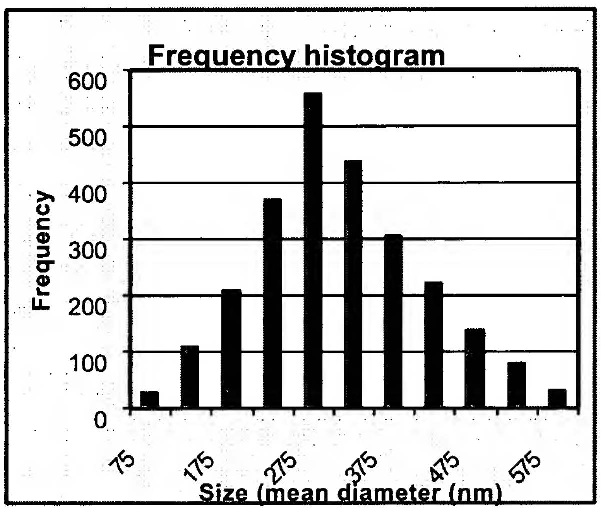

FIGURE 1 A TYPICAL PSD IN THE FORM OF A HISTOGRAM

2 Measuring the Particle Size Distribution

A PSD such as shown in Figure 1 could be obtained by counting the particles of different sizes in a microscope (or electron microscope) image. This is, however, a tedious and time consuming procedure and increasingly we seek methods of estimating the PSD by indirect methods.

Such procedures are of two sorts.

- In some cases we separate out the different sizes and then count (or otherwise estimate) how many particles are in each size range.

- In the second procedure, we try to estimate the PSD without first separating out the different size fractions.

The first method is the preferred one when we have plenty of time because it can, in principle, yield the most reliable results. There are, however, many situations in which it is much better to have a reasonable estimate of the PSD, especially if it can be obtained quickly.

The most obvious such situation is in a flowing process stream where the particle size might be a crucial factor in determining the success of a chemical engineering process. Such situations are common in the ceramics industry, in the food processing, cosmetics manufacture and pharmaceutical industries and even in computer chip manufacture.

Scientists and engineers have applied great ingenuity to the development of such particle sizing methods in recent years and there are now a number of ways of obtaining reliable estimates of PSDs in real time. It is important to recognize, however, that such methods will not normally all yield the same results when applied to a particular system.

That does not mean necessarily that one is more accurate than the rest. Indeed, the only time one can expect different methods to yield exactly the same result is when all of the particles are spherical and of the same size. Different methods measure different aspects of the distribution and sometimes, by combining results from two or more methods, one can obtain information that is not otherwise available from the individual methods.

3 Plotting the Particle Size Distribution

When the particle size distribution is very broad it is difficult to represent it accurately on the normal scale. It is often advantageous in that case to plot the frequency against the logarithm of the size rather than the size itself. A comparison between the two is shown in Figures 2 and 3.

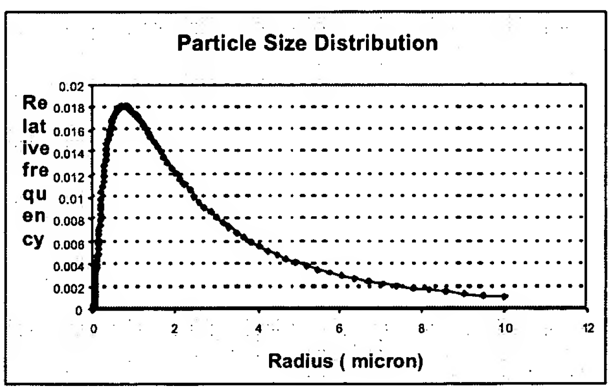

FIGURE 2 A TYPICAL PSD PLOTTED WITH RESPECT TO THE RADIUS (MICRONS)

Notice how asymmetric the plot is in Figure 2 and how the conversion to the log plot (Figure 3) makes for a much more symmetric frequency distribution. The symmetric plot is in this case the normal error curve or the Gaussian distribution function and is the basis of all standard statistical formulae.

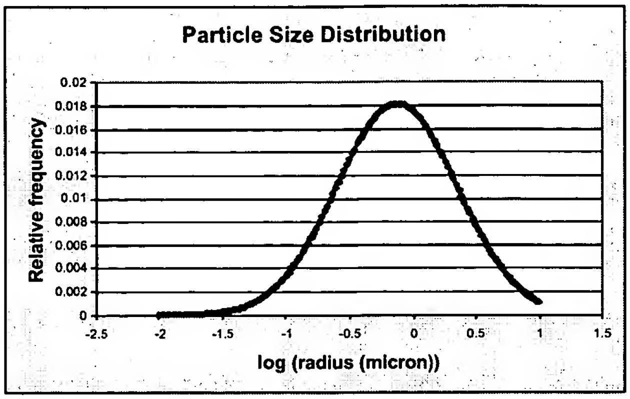

FIGURE 3 THE SAME PSD AS IN FIG 2 PLOTTED WITH RESPECT TO LOG (RADIUS (IN MICRONS))

Figure 3 shows that this particular size distribution is a *log normal distribution*. Since it is so close to the normal distribution curve when plotted in this way, it can be very easily represented. In fact if one specifies the median size (which in this case corresponds to the maximum frequency) and the spread of the distribution, the entire curve is fully specified.

This is the way that most particle size distributions are represented. Almost any real distribution can be approximated in this way, unless it is one that has two or more maxima. Such *multi-modal distributions* are usually thought of as being the sum of two or more normal (or log-normal) distributions.

In some industrial situations it is important to be able to distinguish the presence of a bimodal distribution (where, for example, the presence of a population of larger particles might interfere with the main process). The particle size methods that first separate the different sizes and then measure them are intrinsically better able to detect the presence of a bimodal distribution.

It is, however, sometimes possible to detect such situations, in a rapid real time (on-line) measurement, but only if the peaks in the size distribution are sufficiently separated from one another.